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CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

RESPONSES TO WRITTEN PUBLIC COMMENTS ON THE 13 DECEMBER 2004 DRAFT

OF THE

AMENDMENTS
TO
THE WATER QUALITY CONTROL PLAN FOR THE SACRAMENTO RIVER AND SAN JOAQUIN RIVER BASINS

FOR

THE CONTROL PROGRAM FOR FACTORS CONTRIBUTING TO THE DISSOLVED OXYGEN IMPAIRMENT IN THE STOCKTON DEEP WATER SHIP CHANNEL

26 January 2005

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Introduction

The following provides staff's response to written comments regarding the staff report titled, *Amendments to the Water Quality Control Plan for the Sacramento River And San Joaquin River Basins for the Control Program for Factors Contributing to the Dissolved Oxygen Impairment in the Stockton Deep Water Ship Channel, Draft Final Staff Report*, *13 December 2004* (Draft Final Staff Report).

Two comment letters, as listed in the following table, were received by 13 January 2005 in response to the solicitation. Seven other comments were received by 24 June 2004 on the previous version of the Draft Final Staff Report and were responded to in *Responses to Written Comments on the 24 May 2004 Draft of the Amendments to the Water Quality Control Plan for the Sacramento River And San Joaquin River Basins for the Control Program for Factors Contributing to the Dissolved Oxygen Impairment in the Stockton Deep Water Ship Channel.* Nine other comment letters that were received by 14 May 2004 on the *Public Review Draft Staff Report for the Control Program for Factors Contributing to the Dissolved Oxygen Impairment in the Stockton Deep Water Ship Channel*, dated 8 April 2004 and responded to in *Comments and Responses for April 2004 Draft*, contained in Appendix C of the Draft Final Staff Report.

Comment No.	Name	Affiliation	Date Received
1	G. Fred Lee and Anne Jones-Lee	G. Fred Lee and Associates	11 January 2005
2	Steve Chedester, Executive Director	San Joaquin River Exchange Contractors Water Authority	13 January 2005

Comments received after 13 January 2005 will be considered and responded to at the 27 January 2005 hearing to consider adoption of the proposed Basin Plan Amendment on the Control of Factors Contributing to the Dissolved Oxygen Impairment in the Stockton Deep Water Ship Channel.

Comment Letter # 1: G. Fred Lee and Anne Jones Lee, G. Fred Lee and Associates

11 January 2005

Comments on Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquine River Basins for the control Program for Factors Contributing to the Dissolved Oxygen Impairment in the Stockton Deep Water Ship Channel Draft Final Staff Report

Comment # 1.1
Overall, we find that the CVRWQCB staff, Gowdy and Grober, have done a good job in presenting the issues that need to be addressed to solve the low-DO problem in the DWSC. There are however, several issues that we find need additional attention in the formulation and implementation of this proposed Basin Plan Amendment.

Response:
Comment noted.

Comment # 1.2
One of the major problems with the current CVRWQCB efforts to develop control programs for WQO violations is that they are not conducted in a comprehensive coordinated manner to address well known existing water quality problems in the SJR watershed.

There is immediate need for the state Water Resources Control Board (SWRCB) and the CVRWQCB to develop a much more comprehensive water quality management program in the San Joaquin River watershed that properly considers all of the various water quality issues that are known to exist and will have to be addressed to manage them.

Response:
The interactive effects on the dissolved oxygen impairment from potential control measures for other constituents (and vice versa) are important, but must be evaluated by those responsible for implementing those measures. To the extent that Regional Board staff will review or approve the implementation of such control measures, these interactive effects will be considered. The studies required in the phased dissolved oxygen TMDL will provide information useful in evaluating the impact of potential control measures employed for salt and other constituents on the dissolved oxygen impairment.

Comment # 1.3
In previous comments on the staff's draft Basin Plan Amendment (Lee 2003a) for the low DO TMDL, we have indicated that the one third one third one third approach is not a valid approach for controlling the low DO problem in the DWSC.

Response:
The latest version of the proposed TMDL no longer takes a “one third one third one third approach”. The responsibility for addressing excess net oxygen demand is now assigned 100%

to each of the three main contributing factors. Sharing of this responsibility among the responsible parties must be determined by the parties.

Comment # 1.4

As discussed in our reports and in previous comments to the CVRWQCB staff, the apportionment of oxygen demand loads and factors influencing this problem should focus on the impact of the continued maintenance dredging of the DWSC to maintain navigation depth. The Corps of Engineers continued maintenance dredging of the DWSC is strongly contrary to controlling the low DO problem in the DWSC in the most cost-effective manner. As discussed in our recommended approach for solving the low DO problem (Lee 2003b, Lee and Jones-Lee 2004d) considerable effort needs to be made to get the US Congress to provide funds that can be used to control DO WQO violations associated with mitigation for continued maintenance dredging of the DWSC.

Response:

Regional Board staff will need to address the impact of maintenance dredging on the dissolved oxygen impairment as part of the Section 401 water quality certifications and WDRs that may be required of the U.S. Army Corps by the Regional Board. The Regional Board cannot, however, solicit (nor can we require that anyone else solicit) funding from the US Congress for enabling action by the US Army Corps of Engineers.

Comment # 1.5

Another major responsibility for this problem is due to the manipulations of SJR DWSC flows in the SJR DWSC watershed and South Delta. Recently, the San Joaquin River Water Quality Management Group (SJRWQMG) have focused attention on managing SJR flow and salt loads in the SJR watershed to control violations of the total salt concentrations in the SJR at Vernalis as part of an effort to meet the current water quality objective for salt (TDS, EC) in the SJR at Vernalis. As discussed in our reports, the current 700µmhos/cm EC objective for the SJR at Vernalis needs to be significantly lowered so that the EC in a SJR water that enters the South Delta through the Head of Old River will enable irrigated agriculture in the South Delta to discharge tail water to South Delta channels without causing violations of the South Delta EC WQO of 700 µmhos/cm. At this time the SJRWQMG has failed to address this problem.

Developing a flow and salt load management program for the SJR watershed to meet the 700 µmhos/cm EC WQO at Vernalis may have limited applicability to the management program that will ultimately have to be developed to meet the EC objective that will need to be adopted to enable irrigated agriculture in the South Delta to continue to exist. These issues have been discussed by Lee et al. (2004a,b). While there have been some who claim that the 700 µmhos/cm EC objective for the South Delta channels is overly protective the facts are that total concentrations above this level is detrimental to irrigated agriculture. It will be important to properly consider all the excess salt problems in the lower SJR and South Delta in a comprehensive program. What ever is done with respect to managing flows and the salt loads in the SJR at Vernalis can have significant impacts on managing the low DO problem in the DWSC.

Response:
Comments regarding EC objectives are beyond the scope of this proposed Basin Plan Amendment. See also response to Comment #1.2 regarding the coordination of efforts to address multiple water quality issues in the watershed.

Comment # 1.6
The current SJRWQMG approach to address the impact of SJR watershed flow manipulations on the low DO problem in the DWSC is to address this issue as a secondary issue to managing flows to control total salts in the SJR at Vernalis. Since as documented in our reports, the management of flow in the SJR watershed and in the South Delta are a major contributor to the low DO problem in the DWSC, there is need to focus on determining the maximum readily attainable steady flows of the SJR through the DWSC in order to minimize the funds needed for aeration and oxygen demand load control. As discussed by Lee and Jones-Lee (2003a,c, 2004a) and Lee 2004a,c), it will be important to gain control of SJR DWSC extreme flow variability that occurs now. This variability is directly responsible for some low DO events. Of particular concern are situations where there have been moderate flows of the SJR through the DWSC followed by periods of essentially no flow. This leads to loading up the DWSC with oxygen demand constituents where there is no transport flow through the first 7 miles of the DWSC to Turner Cut. Repeatedly over the past five years that there's been data collected, such situations lead to severe DO depletions below the WQO.

Response:
Providing assessment and comment on the work of the SJRWQMG are beyond the scope of this proposed Basin Plan Amendment. The SJRWQMG will need to evaluate the potential impacts and redirected effects of their proposed actions as part of the corresponding environmental analysis and permitting. The comments provided by the commenter should be forwarded to the SJRWQMG and will be considered by the Regional Board staff as part of their review of any SJRWQMG sponsored projects.

Comment # 1.7
The third area that needs more directed attention then is provided for in the draft Basin Plan Amendment is the control of oxygen demanding substances that are added to the DWSC. As discussed in our reports, the principal sources of oxygen demand for the DWSC are the city of Stockton domestic wastewater ammonia discharges and the algae that develop in the SJR DWSC watershed that are added to the DWSC. With respect to the city of Stockton's ammonia discharges, a review of the data that was collected in 1999, 2000 and 2001, shows that there was only one occasion during the summer and fall when the city of Stockton ammonia discharges were more than 50% of the total oxygen demand load to the DWSC. Generally, the dominant source of oxygen demand was the algae that develop in the DWSC watershed. The exceptions to this situation occurred when the SJR flow to the DWSC was very low as a result of the state and federal export projects pumps sucking all of the SJR Vernalis water into the South Delta through the Head of Old River. Under these conditions, the city of Stockton's wastewater discharged ammonia and other oxygen demand constituents in the wastewater become the dominant source of oxygen demand for the DWSC. During the winter months, especially in February, the city of Stockton's wastewater discharge of ammonia and other oxygen-demanding constituents becomes the primary source of oxygen demand, due primarily to the diversion of SJR Vernalis water into

the South Delta and the low algal content of the SJR water at Vernalis.

Response:
Comment noted. The primary focus of the studies proposed in this TMDL is to identify sources of oxygen demanding substances, their transformation in the watershed, and their fate in the DWSC. The observations described in the comment will be addressed by these studies.

Comment # 1.8
It has been suggested that the winter low-DO problem in the SJR DWSC will not occur in future years when the city of Stockton controls the ammonia discharges to the 2 mg/L monthly average discharge NPDES limit that the CVRWQCB as placed on the cities wastewater discharges. It is important to understand however, that this limit is based on meeting the ammonia concentrations in the lower SJR and upper DWSC that will not lead to violations of the ammonia toxicity water quality criterion established by the US EPA. This limit is based on a monthly average ammonia concentration.

Response:
Comment noted. The 2 mg/L NPDES limit in the City of Stockton permit is based on ammonia toxicity for aquatic organisms. Meeting these limits will likely improve dissolved oxygen conditions in the DWSC. These limits, however, are not based on a quantified linkage with the dissolved oxygen impairment. Once such a linkage is better understood, specific limitations to address the dissolved oxygen impairment that remains at that time will be evaluated.

Comment # 1.9
With respect to the violations of the DO water quality objective, there can only be one violation of this objective by any magnitude at any location in the DWSC every three years. Violations that occur more frequently will require further control of DO concentrations in the DWSC. As indicated in Appendix A, under low flow conditions with the allowed excursions above the 2 mg/L ammonia monthly average discharge limit, there can be DO depletions below the water quality objective in the DWSC that would require further oxygen demand control.

Response:
Comment noted. The phased approach proposed in the TMDL will allow further evaluation of the effects of flow conditions on the impairment.

Comment # 1.10
It will be important that the SJR DWSC flows during all times of the year, including the winter be managed in such a way as to achieve maximum steady flow. There is need for further study to define the minimum flows of the SJR through the DWSC that can be allowed and avoid DO water quality objective violations. For planning purposes, the issue of flow of the SJR through the DWSC should be addressed as a separate issue, not as a secondary issue to salt TMDL flows. The flow needed to meet both of these TMDLs, will need to be addressed by the state Water Resources Control Board as part of the D 1641 water rights hearings where the required flows to optimize solving the salt TMDL and the low DO TMDL to the maximum extent possible through management of SJR and South Delta flows.

Response:
Comment noted. The phased approach proposed in the TMDL will allow further evaluation of the effects of flow conditions on the impairment. See also response to Comment #1.2 regarding the coordination of efforts to address multiple water quality issues in the watershed.

Comment # 1.11
As discussed in the synthesis report and in the supplement to this report, there is need to define the ability to and associated costs for controlling the high algal loads (oxygen demand loads) that developed in the SJR upstream of Mossdale. Of particular importance is the role of algae that develop in Mud and Salt Slough watersheds that become the major algal oxygen demand source that enter the DWSC that lead to DO violations below the WQO. As discussed in the synthesis report, and in other comments in reports on our web site, www.gfredlee.com, the upstream monitoring program developed by agricultural interests falls far short of a credible oxygen demand source study to determine whether it is economically possible to control oxygen demand that develops in the SJR DWSC watershed through the control of nutrients in the headwaters of Mud and Salt Sloughs. Both Drs. Foe and Lee independently, commented on the draft proposed monitoring program on the significant deficiencies in this program. While those responsible for developing the program claimed to the SJR DO TMDL steering committee that these issues would be addressed in finalizing the proposal, in fact they were not addressed. As discussed by Lee (2003d), this caused the upstream monitoring proposal to be technically flawed.

Response:
The Basin Plan Amendment does not address the specific technical manner in which studies must be performed. These comments will be considered by Regional Board staff as part of their review of plans submitted by July 2005, and their subsequent progress and final output. These comments should also be addressed to the agencies responsible for these studies.

Comment # 1.12
Lee (2003d) also pointed out in his comments to CALFED/CBDA that there are several other reasons not to fund this proposal including the fact that the salt TMDL implementation could significantly affect the oxygen demand load that reaches the DWSC in the form of upstream developed algae. Now that the SJRWQMG has begun to formulate an approach for controlling the excessive TDS/EC in the SJR at Vernalis it is clear that conducting studies now before the salt TMDL implementation approach is better defined could lead to a waste of CALFED/CBDA funding. Any alterations of salt load and or flows affect in the mud and salt Slough watersheds could readily impact the nutrients that develop into algae in the sloughs that become the primary seed for the algal load of oxygen demand to the DWSC from upstream sources.

Response:
See responses to Comment #1.6 and Comment #1.11.

Comment # 1.13
Another issue that needs to be investigated as part of formulating the final TMDL to control the low-DO problem in the DWSC, is the potential benefits of reducing nutrient concentrations in the SJR upstream of the DWSC on the algae associated oxygen demand loads to the DWSC that cause DO WQO violations. While both nitrogen and phosphorus are present in the SJR at

concentrations well above growth rate limiting concentrations, there is evidence from the literature (Lee and Jones-Lee 2002, Van Nieuwenhuyse 2004) that even under the conditions of surplus nutrients, reducing the nutrient loads/concentrations especially phosphorus can reduce the magnitude of algal biomass that develops in a waterbody. As outlined in Appendix A, the situation that developed in the Rhine River in Europe where reducing phosphorus loads/concentrations in the Rhine reduced the algae concentrations and the dissolved oxygen water quality problems. Similar situations have been observed for a number of waterbodies where reducing the phosphorus concentration in the waterbody through reducing the phosphorus loads to the waterbody resulted in reduced algal biomass and improve water quality. This same kind of situation could occur in the SJR upstream of the DWSC. Studies need to be conducted to determine whether this is feasible and the potential costs of nutrient control to eliminate DWSC DO WQOs violations. Jassby and Van Nieuwenhuyse (2004) and Dahlgren and Van Nieuwenhuyse (2004) has recently provided additional information that is pertinent to understanding and managing of the development of planktonic algae in the SJR DWSC watershed. Studies significantly different from those that were approved by CALFED/CBDA in the fall 2003 will need to be conducted however to properly examine the situation.

Response:
Comment noted. As a potential precursor to the formation of oxygen demanding substances, nutrient sources in the watershed will be considered in the final TMDL.

Comment # 1.14
Because of the way in which the upstream monitoring program was developed by the agricultural interests, a significant conflict of interest situation has developed in conducting the proposed upstream studies. The currently proposed CVRWQCB Basin Plan Amendment calls for dischargers such as upstream agricultural interests including irrigation district managers to conduct studies on the impact and control of oxygen demanding substances in the SJR watershed. Under the conditions that exist where those responsible for developing these studies have deliberately avoided the development of data that could show that a particular discharger is significantly contributing to the low-DO problem, There is need to appoint an independent science/engineering review panel who would be responsible for formulating the approach for conducting upstream studies, review of the study results as there being developed and review of the adequacy of the reports that a developed by those conducting studies. The members of this panel should not be agricultural interests or others who have a vested interest in how the DO TMDL is implemented.

Response:
As part of executing the upstream and modeling studies it has funded, the California Bay-Delta Authority (CBDA) has organized a technical work group to provide this type of technical oversight and interaction. The CBDA and Regional Board staff are also planning ways to bring regular independent scientific peer-review into the process of executing all studies related to the dissolved oxygen TMDL. The details of such technical study management are beyond the scope of this proposed Basin Plan Amendment.

Comment # 1.15
Rather than allocating responsibility for controlling the low-DO problem based on a one third one third one third approach in which each of those responsible for a third are to develop study programs and report the results to the Regional Board in 2008, the Basin Plan Amendment should define the issues that need to be properly addressed and indicate that the CVRWQCB working with an advisory panel will be developing specific guidance on the studies it need to be done. In addition the overall framework for administration of the studies should be clearly delineated. The current approach as presented in the proposed Basin Plan Amendment is far too nebulous and could readily lead to little being accomplished compared to that needed to develop a final TMDL to control the low-DO problem in the DWSC.

Response:
See responses to Comments #1.3 and 1.14.

Comment # 1.16
One of the most significant deficiencies in the proposed Basin Plan Amendment is the failure to initiate work to develop more appropriate DO water quality objectives for the SJR DWSC. These issues are discussed in the "issues" and "synthesis" report's and in comments submitted by Lee (2004b). They are also outlined in Appendix A. The current Basin Plan requirement limiting the number of WQOs violation's to only one of any magnitude and any location every three years will place severe unnecessary constraints on oxygen demand control. Other states with the approval of US EPA, adopt diel (night to day) averaging of the daily DO. This can be extremely important in the DWSC since at times, early morning to late afternoon changes in DO in the near surface water can be as much as 8 mg/L. Also there is need to consider that the waters within the bottom meter of the DWSC can be 1 to 2 mg/L lower in DO than the waters that mid depth. Eliminating the WQO DO violations that occur near the bottom and in the early morning will require a much more comprehensive water quality monitoring program than has been proposed by CBDA consultants. Eliminating these violations compared to averaging over the day for with depth will not be significantly detrimental to the aquatic life resources of the DWSC.

One of the most significant areas that need attention is the validity of the 6 mg/L DO WQO as being necessary to allow migration of Chinook salmon through the DWSC. As discussed in the synthesis report is considerable information that would lead to the conclusion that that an average with depth and during the day 5 mg/L would allow unimpeded Chinook salmon migration through the DWSC. As part of developing the basin plan amendment, a component of this plan should be specific delineating a study plan to develop appropriate DO WQOs for the upper DWSC. Failure to begin to address this issue at this time could result in the expenditure of large amounts of public and private funds for aeration, SJR flow modification, and oxygen demand source control beyond that needed to adequately protect the designated beneficial uses of the DWSC.

Response:
The phased TMDL allows for time to evaluate the need for modifications to the dissolved oxygen water quality objectives. The comments provided will be considered as part of determining whether to re-evaluate this objective. It should be further noted that the 6.0 mg/L

objective was adopted by the State Water Resources Control Board and would need to be addressed by a change to their Bay-Delta Water Quality Control Plan.

Comment # 1.17
Beginning on page 33 of the staff report is a discussion of the impact of SJR Head of Old River flow diversions associated with the export pumping of South Delta water by the state and federal projects on the low-DO problem. While references made to a discussion of this issue in the synthesis report, there is considerable additional information on this issue in supplements to the synthesis report and in special reports that have been completed in 2003 and 2004 by Lee and Jones-Lee. The additional information clearly documents that the state and federal export projects drawing SJR Vernalis water into the South Delta is a major cause of low DO problems in the DWSC. The references that should be added to the Basin Plan Amendment discussing this issue include Lee 2003a,c, Lee (2004a), Lee and Jones-Lee (2003a,b, 2004c).

Response:
Comment noted. This additional information will be considered as part of our review of the potential impacts of the SDIP and the final TMDL.

The administrative record for the dissolved oxygen TMDL must include documents that were relied upon to make the staff recommendation and the Regional Board decision for the Basin Plan Amendment. The record includes key references cited in the staff report, written comments received, and responses to those comments. The record does not include all documents submitted by interested parties or references referred to by interested parties. To be included, such documents have to be submitted in a timely manner, relevant to the action, and reviewed and considered in the decision. Documents are not likely to be included in the record unless such a document, or portion thereof, is specifically referenced and used in a written public comment or direct testimony before the Board. No information was provided in this comment regarding which portions of the two cited references should be considered.

Comment # 1.18
Page 37 of the staff report presents two oxygen demand loading diagrams which relate the allowable loading of oxygen demand to the DWSC as a function of SJR DWSC flow and temperature. As discussed in the past comments, these diagrams are in error at the upper flows since at these flows much of the oxygen demand added to the DWSC is exported via Turner Cut and Columbia Cut. As the flows increase through the DWSC, higher oxygen demand loads can be added to the DWSC without causing DO WQO violations. This is the reason why at SJr DWSC flows above about 1,500 cfs violations of the DO WQO do not occur in the DWSC.

Response:
These figures are based on the application of Equation 4-1 and represent the theoretical allowable oxygen demand at any one location in the DWSC. Although the comment probably has validity with regard to oxygen demand exerted in the DWSC as a whole, it does not apply to Equation 4-1. Ultimately these figures are provided primarily for reference and are not the basis for apportioning or allocating responsibility for excess net oxygen demand.

Section 4.3.3 of the staff report describes the relationship between flow and the dissolved oxygen impairment. Figure 4-3 shows that violations do still occur for flows above 1,500 cfs. As stated in the report, "for net daily flow above 3,000 cfs, there were no violations of either the 5.0 or the 6.0 mg/L Basin Plan DO objectives. Below 3,000 cfs, the DO concentrations decrease with decreasing flow."

Comment # 1.19

Lee and Jones-Lee (2004f) have developed a comprehensive review of the current water quality problems in the Delta as evidence by existing TMDLs. As they discuss several of these TMDLs are impacted by the state and federal South Delta export projects. These issues need to be addressed by the SWRCB as part of its D 1641 water rights review. Included within this review should be consideration of the requirements imposed by the U.S. Congress (2004) passage of HR 2828 Water Supply Reliability and Environmental Improvement Act. Included within this review should be consideration of the requirements imposed by the U.S. Congress (2004) passage of HR 2828 Water Supply Reliability and Environmental Improvement Act.

Lee and Jones-Lee (2004) have discussed how the export projects are impacting WQO violations in the Delta. There is need to begin to address these issues as part of any further water diversions/flow manipulation in the Delta and its tributaries. Appendix A presents a summary of the issues that need to be addressed in a coordinated effort by the CVRWQCB and the SWRCB on the slides, "Current Investigative Effort not Adequate to Meet Needs."

Response:

See response to Comment #1.2

Comment Letter # 2: Steve Chedester, Executive Director, San Joaquin River Exchange Contractors Water Authority

13 January 2005

RE: Draft Final Staff Report, Amendments to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control Program for Factors Contributing to the Dissolved Oxygen Impairment in the Stockton Deep Water Ship Channel (13 December 2004)

Comment # 2.1
The basis for the proposed allocation of responsibility is fundamentally flawed. Staff observes that if any one of the three "contributing factors" were removed, the problem would be eliminated. Staff goes on to make the illogical leap that therefore each of the three "contributing factors" should be held equally responsible for solving the problem. The observation that the elimination of a particular factor would eliminate the problem does not support the conclusion that the factor should be held responsible for solving the problem. The use of this faulty reasoning will lead to ludicrous conclusions.

Response:
Each of the three main contributing factors to the dissolved oxygen impairment are caused or aggravated to some degree by human activity and are controllable. It is not illogical to assign responsibility for addressing the impairment resulting from these controllable activities. Understanding the difficulty associated with directly controlling certain contributing factors (DWSC geometry), led Regional Board staff to recommend consideration of alternative mitigation measures (i.e. aeration).

Comment # 2.2
Instead of using flawed logic or arbitrarily allocating responsibility for solving the DO problem in the DWSC, the Board must analyze the policy implications of the initial allocation of responsibility among the three "contributing factors". Additionally, the Board must analyze the policy rationale for the allocation of responsibility between point sources and non-point sources. Each of these determinations should be made with a thorough understanding of the policy reasons for the proposed allocation.

Response:
The policy and economic implications of the proposed TMDL were analyzed in Section 5 of the Draft Final Staff Report. This analysis complies with applicable State and federal laws governing such analysis for TMDLs and Basin Plan Amendments.

Comment # 2.3
The lower San Joaquin River has contained naturally occurring algae for hundreds of years.

Response:
This comment is likely to be correct, however, little or no data exists on historical algae

concentrations in the San Joaquin River. Regardless, the discharge of nutrients and other algae precursors from agricultural and other discharges contribute to the growth of algae, and loads of algae to the DWSC have been identified as a contributing factor to the impairment. The presence of algae for hundreds of years is not relevant to the fact that current algae levels are contributing to the dissolved oxygen impairment. There are many naturally occurring water quality constituents that are benign at background levels but can cause adverse environmental effects when increased in concentration through direct or indirect anthropogenic inputs. Selenium, for example is a naturally occurring element that has been present in some concentration in soils and water of the San Joaquin River. Human development (irrigation and agriculture), however, have increased mobilization of selenium leading to adverse environmental effects that have been addressed in the Basin Plan by a control program for subsurface agricultural drainage. One of the purposes of the upstream studies, as described in the staff report, is to determine the sources and linkages of upstream algal loads on the DO impairment.

Comment # 2.4
Significant agricultural production has been in existence in the San Joaquin River watershed since the 1800's and the discharges from these farming activities have consistently contained nutrients sufficient to sustain algae growth in the River and adjoining sloughs.

Response:
Regional Board staff is not aware of historical data (prior to around the 1950's) on nutrient concentrations in discharges from agricultural activities or in the receiving water. Such data (along with the source and linkage studies required in the proposed control program) could be useful in further refining the wasteload and load allocations when the Regional Board reconsiders these allocations by December 2009.

Comment # 2.5
Algae are a natural and necessary part of the food chain in the lower San Joaquin River. The ecosystem would be harmed by eliminating nutrients and algae in the River.

Response:
The Regional Board is not proposing to eliminate nutrients and algae in the River. The proposed Basin Plan Amendment does not direct the level and manner in which the impact of algae loads (on the dissolved oxygen in the DWSC) is controlled. Considering the redirected effects of any proposed control measures are important and must be evaluated by those responsible for their implementation.

Comment # 2.6
There is not a low DO problem in the San Joaquin River upstream of the DWSC.

Response:
Staff agrees; the extent of any impairment in the vicinity of the DWSC, if the DWSC were not present, is not known. Furthermore, it is not clear that upstream sources of oxygen demanding substances and their precursors haven't negatively impacted water quality (and reduced assimilative capacity) upstream of the DWSC, so that dissolved oxygen objectives are more frequently and substantially violated. The upstream studies will provide information needed to

better evaluate the contributions of oxygen demanding substances to the dissolved oxygen impairment.

Comment # 2.7
Experts do not understand the dynamics of upper watershed loading on the DO problem in the DWSC. Algae originating from nearly 100 miles upstream may not actually reach the DWSC.

Response:
The staff report refers to empirical data and analyses that show a strong correlation between algae loads and the existence of the dissolved oxygen impairment. This provides adequate justifications for the requirement that those potentially responsible for sources of oxygen demanding substances and their precursors perform the proposed upstream source and linkage studies. Based on results of these studies and other information, allocations and other elements of the DO control program, as well as the conditional prohibition, will be reconsidered upon completion of the upstream studies.

Comment # 2.8
The prohibition of all agricultural discharges into the San Joaquin River upstream of the DWSC would NOT cure the DO problem in the DWSC.

Response:
The proposed Basin Plan Amendment does not prohibit all agricultural discharges into the San Joaquin. The Amendment does contain a conditional prohibition of discharge that allows a discharge if it does not have a reasonable potential to negatively impact the impairment or if other measures otherwise taken in the watershed have already resulted in attainment of water quality objectives in the DWSC. At this time more information is needed about how these discharges impact the impairment so staff can determine their relative contribution and what can reasonably be done to control them. The phased TMDL provides the time and requires the studies needed to obtain this information.

Comment # 2.9
Algae in the natural depth portion of the San Joaquin River produce oxygen by photosynthesis and help oxygenate the water.

The unnatural depth of the DWSC kills algae in the River and turns oxygen producing live algae into oxygen demanding decaying algae.

Response:
The comment is oversimplified, but is roughly correct. It was for these reasons, however, that loads of algae to the DWSC were found by Regional Board staff to be partially responsible for the dissolved oxygen impairment, and their impact warrants control.

Comment # 2.10
The artificial depth of the DWSC and the U.S. Army Corp of Engineers' (Corp of Engineers) decision to save money by building the channel in the middle of the San Joaquin River are the ultimate cause of the DO problem.

Response:
Comment noted. As described in the staff report, DWSC channel geometry is one of three contributing factors to the DO impairment.

Comment # 2.11

[*The Regional Board should*] *(f)*orce the Corp of Engineers to mitigate the impacts caused by the DWSC

a. Enforce the commitments made in the September 1980 EIS for the 35' excavation of the DWSC.
b. Prohibit further maintenance dredging of the DWSC until all DO impacts in the DWSC are mitigated by the Corp of Engineers.
c. Investigate alternative methods of motivating the Corp of Engineers to solve the DO problem in the DWSC, such as the enforcement of NPDES permit conditions for the 1980's dredging project. EPA has a legal responsibility to enforce NPDES requirements. The Regional Board should remind the EPA of this authority.

Response:
a) The Regional Board does not have authority to enforce compliance with commitments made by the U.S. Army Corps of Engineers in their 1980 EIS. The proposed Basin Plan language, however, does include a requirement, pursuant to California Water Code section 13267, that the U.S. Army Corps of Engineers identify and quantify the impact of the DWSC geometry on the dissolved oxygen impairment. The proposed language also includes a recommendation that the U.S. Army Corps of Engineers reduce the impacts of the existing DWSC geometry on excess net oxygen demand.
b) Regional Board staff will evaluate the impact of maintenance dredging on the dissolved oxygen impairment when issuing the Waste Discharge Requirements and Section 401 Water Quality Certifications that the U.S. Army Corps of Engineers will need prior to conducting any such dredging. The proposed Basin Plan Amendment will provide the policy basis for requiring that such projects must consider their impact on the dissolved oxygen impairment.

c) Neither the Regional Board nor USEPA has the authority to issue an NPDES permit to the USCOE since there is no discharge to regulate.

Comment # 2.12

[*The Regional Board should*] *(a)*llow time to complete studies currently being undertaken by the San Joaquin Valley Drainage Authority to help better understand the dynamic of algae in the River as they relate to loading in the DWSC and other related studies.

Response:
The proposed Basin Plan Amendment already provides this time; item 6 in the proposed Control Program states: "The Regional Water Board will review allocations and implementation provisions based on the results of the oxygen demand and precursor studies and the prevailing dissolved oxygen conditions in the DWSC by December 2009."

Comment # 2.13
[*The Regional Board should*] *(a)*llow time to complete aeration studies and the construction of an operable aerator as the ultimate solution to the DO problem in the DWSC. These projects are currently underway.

Response:
The proposed TMDL actually takes a phased approach that provides considerable extra time for such studies. There is, however, significant uncertainty about the ability of aeration to provide a complete solution to the problem. Further study of other potential solutions is required to develop a comprehensive approach.

Comment # 2.14
[*The Regional Board should*] *(a)*llow stakeholder time to develop a funding package for the operation of an aerator in the DWSC once cost estimates are established by aeration feasibility studies.

Response:
See responses to Comments 2.12 and 2.13 above.

Comment # 2.15
The Regional Board should NOT:

1. Allocate responsibility for solving the DO problem in the DWSC as outlined in the proposed Basin Plan Amendment and staff report.
2. Adopt a Basin Plan Amendment with little to no policy analysis of the fundamental issues.
3. Place responsibility for solving the DO problem in the DWSC on parties that are not the proximate cause of the problem simply because of perceived inadequate statutory authority of the Regional Board to compel the party (Corp of Engineers) actually responsible for causing the DO problem in the DWSC.

Response:
The policy and economic implications of the proposed TMDL were analyzed in Section 5 of the Draft Final Staff Report. This analysis complies with applicable State and federal laws governing such analysis for TMDLs and Basin Plan Amendments.

A cause need not be proximate (or immediately precede and produce an effect) to be considered one of the primary factors. Though details need to be better understood, it is already clearly understood that loads of algae from upstream contribute to the cause of the impairment. This is the reason for assigning responsibility to loads of oxygen demanding substances in the proposed TMDL. At the same time the proposed TMDL also assigns responsibility to the U.S. Army Corps of Engineers for its role in creating the DWSC geometry.

Comment # 2.16
The Exchange Contractors are committed to resolving water quality problems in the region. We continually demonstrate this commitment by our actions. As part of the San Joaquin Valley

Drainage Authority, we are undertaking extensive studies (totaling $6.8 million) on the San Joaquin River to determine the dynamics of algae growth in the River.

Response:
The important contribution of the Exchange Contractors to water quality improvement efforts in the watershed is acknowledged.

Comment # 2.17
We plan to continue this proactive approach but adoption of this inequitable dissolved oxygen TMDL and Basin Plan Amendment will serve to undermine the credibility of the Regional Board and make it more difficult for growers in the Central Valley to embrace current and future water quality programs.

Response:
Comment noted.

Comment # 2.18
We ask the Regional Board to reject the simplistic allocation of responsibility proposed in the DO TMDL and Basin Plan Amendment, and, instead place the responsibility for solving the problems created by the construction of the Stockton Deep Water Ship Channel on those who made the decision to build the channel in the main stem of the San Joaquin River. The rest of the water users in the basin must be allowed to focus their limited resources on other water quality problems within the basin.

Response:
Comment noted.